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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,050	08/11/2006	Timothy Robert Hawkes	70294US	5616

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SYNGENTA BIOTECHNOLOGY, INC.
PATENT DEPARTMENT
3054 CORNWALLIS ROAD
P.O. BOX 12257
RESEARCH TRIANGLE PARK, NC 27709-2257

EXAMINER

FOX, DAVID T

ART UNIT	PAPER NUMBER
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1638

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/564,050	Applicant(s) HAWKES, TIMOTHY ROBERT	
	Examiner David T. Fox	Art Unit 1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Restriction/Election

Applicant's election without traverse of Species I, male-sterile plants and methods of producing them, in the reply filed on 10 March 2009 is acknowledged.

Specification Objections

Abstract

This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

Applicant's submission of the first page of the published PCT application is noted. However, the image file wrapper may not be amended to remove the extraneous portions of that page. Applicant is requested to submit an Abstract on a separate page, which has no other markings or drawings on the page.

Headings

The specification is objected to for its omission of headings.

On page 1 of the specification, immediately below the paragraph added by the preliminary amendment of 09 January 2006, and immediately above current line 3, the heading ---Background of the Invention--- should be inserted.

On page 4 of the specification, between lines 8 and 9, the heading ---Summary of the Invention--- should be inserted.

On page 8 of the specification, immediately above line 26, the heading ---Detailed Description of the Invention should be inserted.

Drawing Description

The specification is objected to for its omission of a Brief Description of the Drawing. This section, with the appropriate heading, should be inserted on page 8 of the specification, immediately above the "Detailed Description" heading.

Claim Objections

Claims 5 and 7 are objected to for their inclusion of the following typographical errors:

In claim 5, line 2, a forward slash should be inserted between "and" and "or".

In claim 7, line 2, the first recitation of "a" should be deleted.

All specification and claim amendments should comply with 37 CFR 1.121(b+c).

Indefiniteness

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2 and 4-7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Dependent claims are included in all rejections.

Claim 2 is indefinite in its recitation of "the means" as it is unclear whether this refers to the first or second means recited in claim 1.

Claim 4 is indefinite in its recitation of "the first enzyme" and "the second enzyme" which lack antecedent basis in claim 1. Amendment of claim 4 to depend upon claim 3 would obviate this rejection.

Claim 5 is indefinite in its recitation of "the L-phosphinothricin" which lacks antecedent basis in claim 1 on which it depends. The claim should be amended to depend upon claim 3.

Obviousness

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fabijanski et al (US 5,356,799) in view of Barry et al (US 5,463,175).

The claims are drawn to a method of producing male sterile plants comprising the provision of a means for herbicide inactivation and a means for herbicide reactivation, wherein the herbicide inactivating means is produced within vegetative tissues and the reactivating means is specifically produced in male reproductive structures, wherein one of the above means is an enzyme; followed by plant treatment with the herbicide.

Fabijanski et al teach a method for producing a male sterile plant comprising A) transforming the plant with 1) an herbicide resistance coding sequence operably linked to a constitutive CaMV 35S promoter expressed in vegetative tissues, and 2) an antisense RNA encoding sequence which inhibits expression of the herbicide resistance coding sequence, said antisense RNA encoding sequence under the control of a pollen-specific promoter, wherein the pollen is part of the male reproductive structure; and B)

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treating the plant with the herbicide. Fabijanski et al also teach the use of an antibiotic-inactivating hygromycin phosphotransferase gene, and suggest the broad applicability of their method in a variety of crop plants including tobacco, tomato and Brassica; and suggest a variety of herbicide resistance genes including glyphosate resistance genes. See, e.g., claims 1-3 and 5; column 5, lines 33-59; and column 32, line 17 through column 35, line 6.

Fabijanski et al do not teach explicitly plant transformation with a gene encoding an enzyme which deactivates an herbicide.

Barry et al teach plant transformation with the glyphosate oxidase gene which inactivates the herbicide glyphosate, to produce herbicide resistant plants of a variety of plant species (see, e.g., claims 1 and 9-10).

It would have been obvious to one of ordinary skill in the art to utilize the method for producing male sterile plants by plant transformation with an herbicide resistance gene under the control of a vegetative promoter, and a gene inactivating the herbicide resistance under the control of a male tissue-specific promoter, as taught by Fabijanski et al; and to modify that method by incorporating the glyphosate oxidase gene taught by Barry et al, as suggested by Fabijanski et al. Choice of known herbicide resistance gene would have been the optimization of process parameters.

Claims 1-2, 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Quandt et al (US 6,384,304) in view of McCabe et al (1999, Theoretical and Applied Genetics 99: 587-592).

The claims are drawn to a method of producing male sterile plants comprising A) plant transformation with 1) a phosphinothricin acetyl transferase (PAT) coding sequence which inactivates the herbicide phosphinothricin, under the control of a vegetative promoter including a plastocyanin promoter, and 2) a hydrolase or amidase coding sequence under the control of a male tissue-specific promoter; and B) treating the plant with phosphinothricin.

Quandt et al teach plant transformation with a deacetylase (hydrolase) coding sequence under the control of tapetum-specific promoters, wherein the tapetum is part of the male reproductive tissue, and wherein the deacetylase reactivates the herbicide phosphinothricin which was deactivated by acetylation. Quandt et al also suggest plant transformation with a phosphinothricin acetyl transferase ("pat" or "bar") gene, wherein treatment of the plant with phosphinothricin (PPT) results in deactivation of the PPT herbicide throughout the plant, and selective destruction of the male reproductive tissue due to the male tissue-specific reactivation of the PPT herbicide, thus causing male sterility. Quandt et al suggest the application of their method to a variety of crop plants. See, e.g., column 4, lines 17-30 and 54-64; column 7, line 59 through column 8, line 6; column 11, line 50 through column 12, line 27; claims 1 and 5-7.

Quandt et al do not actually teach a plant which has been transformed with both the pat gene and the deacetylase gene, or the use of the plastocyanin promoter.

McCabe et al teach plant transformation with the bar gene encoding phosphinothricin acetyl transferase, said bar gene under the control of a plastocyanin promoter for constitutive expression in vegetative tissues to confer herbicide resistance

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to the whole plant, wherein the plastocyanin promoter gave higher levels of gene expression and was resistant to inactivation (see, e.g., page 587, Abstract; page 588, Figure 1, the first full paragraph of column 1, and the second and third paragraphs of column 2; page 590, Table 1; page 591, paragraph bridging the columns, and the first full paragraph of column 2).

It would have been obvious to one of ordinary skill in the art to utilize plant transformation with a deacetylase gene under the control of a tapetum-specific promoter for selective destruction of male tissue which has been exposed to the acetylated form of the herbicide phosphinothricin, as taught by Quandt et al; and to modify that method by also transforming the plant with the bar gene encoding PAT under the control of the highly expressed plastocyanin promoter taught by McCabe et al; given the suggestion to do so by Quandt et al, and the recognition by those of ordinary skill in the art of the advantages of conferring the highest level of herbicide resistance to those plant parts which are to be retained.

Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Quandt et al (US 6,384,304) in view of McCabe et al (1999, Theoretical and Applied Genetics 99: 587-592) as applied to claims 1-2, 4 and 6 above, and further in view of Bartsch et al (US 6,555,733).

Claims 3 and 5 are drawn to the above process, where the deacetylase enzyme is capable of acting on L-phosphinothricin, and wherein the L-phosphinothricin is applied to the plant together with the D-form of L-phosphinothricin and/or safeners.

Quandt et al (US 6,384,304) in view of McCabe et al (1999, Theoretical and Applied Genetics 99: 587-592) teach the above method, but do not explicitly teach that their deacetylase genes act on the L-form of phosphinothricin, and do not explicitly teach the other claimed components of the plant treatment composition.

Bartsch et al teach genes encoding deacetylases which are able to utilize L-phosphinothricin acetylase as a substrate, said deacetylase genes under the control of tapetum-specific promoters for the reactivation of mixtures of L- and D- forms of the acetylated phosphinothricin, thus producing male sterile plants, wherein the use of such substrate-specific enzymes is advantageous. See, e.g., column 1, lines 16-34; column 6, lines 1-8; column 9, line 24 through column 10, line 52.

It would have been obvious to one of ordinary skill in the art to utilize the method of producing male sterile plants via transformation with a vegetatively expressed pat gene and a male tissue-specifically expressed deacetylase gene, as taught by Quandt et al in view of McCabe et al, and to modify that method by incorporating the specific deacetylase gene taught by Bartsch et al, given its advantages as suggested by Bartsch et al. Choice of known deacetylase gene would have been the mere substitution of one element for an equivalent one, within the skill level of the ordinary artisan. Moreover, the addition of safeners to avoid plant injury from herbicides is well known in the art.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Quandt et al (US 6,384,304) in view of McCabe et al (1999, Theoretical and Applied Genetics 99: 587-592) as applied to claims 1-2, 4 and 6 above, and further in view of Williams et al (US 5,977,433).

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The claim is drawn to the above method, wherein the plant is transformed with the pat gene under the control of a vegetative promoter and a second male tissue-specific promoter that is specifically expressed in a different male reproductive tissue from the promoter driving the deacetylase gene.

Quandt et al in view of McCabe et al teach plant transformation with a deacetylase gene and a pat gene as discussed above, but do not additionally teach a pat gene under the control of a different male tissue-specific promoter.

Williams et al teach plant transformation with male sterility and male fertility restorer genes, wherein two different male sterility genes are utilized, under the control of a tapetum-specific promoter or a pollen-specific promoter; for sterility control and maintenance of sterile plants (see, e.g., claims 1 and 3-8).

It would have been obvious to one of ordinary skill in the art to utilize the method of producing male sterile plants taught by Quandt et al in view of McCabe et al, and to modify that method by incorporating different promoters for the same type of fertility-affecting gene, for increased control of the process, as taught by Williams et al.

Conclusion

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David T. Fox whose telephone number is (571) 272-0795. The examiner can normally be reached on Monday through Friday from 10:30AM to 7:00PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anne Marie Grunberg, can be reached on 571-272-0975. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/David T Fox/

Primary Examiner, Art Unit 1638

May 24, 2009